

Running head: A STUDY OF RVUS AND PROVIDER PRODUCTIVITY

Provider Productivity: A Comparative Study of the
Relative Value Unit as a Practice Management Tool at
Landstuhl Regional Medical Center, Landstuhl Germany

A Graduate Management Project

Submitted to the Faculty of

U.S. Army-Baylor Graduate Program in Healthcare Administration

Baylor University

By

Anthony L. Portee, Captain, USA, AN

July 19, 2004

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE 19 JUL 2004		2. REPORT TYPE N/A		3. DATES COVERED -	
4. TITLE AND SUBTITLE Provider Productivity: A Comparative Study of the Relative Value Unit as a Practice Management Tool at Landstuhl Regional Medical Center, Landstuhl Germany				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Landstuhl Regional Medical Center, CMR 402 APO AE 09180				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release, distribution unlimited					
13. SUPPLEMENTARY NOTES The original document contains color images.					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT UU	18. NUMBER OF PAGES 40	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

Acknowledgements

Several people provided input and support in completing this project. First, I would like to thank LTC Derick Ziegler, my preceptor, for his counsel and positive critique of this project. His insight and guidance was a valued asset during my entire residency and I look forward to continued service with him following my residency. LTC Christopher Pate, my academic advisor, provided me with support and guidance at critical times during the construction of this project. MAJ Jessie Tucker III, Mrs. Nygamid Georgakakos, Mrs. Jennifer Cliette, and Mrs. Denise Rinder played pivotal roles in the development of my hypothesis and I cannot thank them enough. Additionally, I offer my thanks and appreciation to MAJ Mark Probus, MAJ Tim Hoiden, MAJ Hugh McLean, and the providers in the Family Practice Clinic for their support and guidance. Finally, I gratefully thank my family, Cheri, Makyla and Devin for their patience, support, and understanding in the completion of this endeavor.

Abstract

The purpose of this Graduate Management Project is to gain an understanding of the relationship between provider productivity, coding accuracy, and coder characteristics at Landstuhl Regional Medical Center, Landstuhl Germany. Results of correlation analysis indicate that formal training and duty position play a role in determining a provider's productivity level.

Statistical analysis of the data revealed that higher relative value units (RVUs) were associated with trained coders ($r_{pb} = .351, p < 0.001$), and with Noncommissioned Officers ($r_{pb} = -.351, p < 0.001$) serving as timekeepers. The results suggest that the RVU should not be used as the sole indicator of provider productivity in all military treatment facilities:

organizational decisions informed by RVU analysis must be tempered by the effects that other contextual variables have on productivity. The results of this study suggest that providers at LRMC may not receive RVU credit for as much as 70% of their patient visits and that additional research is needed to fully address the issue of provider productivity in the Military Health System. The author believes this study will raise questions concerning the reliability of the RVU as a management tool for measuring provider productivity at LRMC.

Table of Contents

1. List of Tables	5
2. Introduction	6
Conditions Which Prompted the Study	8
Statement of the Problem	11
Review of Literature	12
Purpose	20
3. Methods and Procedures	20
4. Results	24
5. Discussion	26
6. Limitations	31
7. Recommendation and Conclusion	32
References	34
Appendixes	37

List of Tables

1. Relative Value Unit Calculation	14
2. Descriptive Statistics	25
3. Point-Biserial Coefficients	25
4. Regression Analysis	26
5. April 2003 Missing Data	28

Provider Productivity: A Comparative Study of the Relative
Value Unit as a Practice Management Tool at Landstuhl Regional
Medical Center

Introduction

Curtailling the cost of healthcare continues to be a prominent topic in both the civilian and military healthcare settings. To help curtail the increased costs associated with providing quality healthcare, healthcare managers have begun to utilize quantitative techniques to improve the management of their practices in the areas of quality, cost, and access.

In today's heavily resources-constrained environment, the federal government is beginning to understand the importance of accounting for the utilization of scarce resources. This is especially true within the Department of Defense (DOD). The DOD receives its budget through the appropriations process annually from Congress. The money appropriated to DOD flows through the Secretary of Defense, Deputy Secretary of Defense, Under Secretary of Defense for Personnel and Readiness to the Assistant Secretary of Defense (ASD) for Health Affairs (Chin, 2002). The ASD distributes the appropriated funds to the various service Surgeons General. Finally, the Surgeons General then distributes these funds to the different medical commands and Military Treatment Facility (MTF) commanders. The MTF commanders then use the appropriated funds to provide care to eligible beneficiaries.

The amount of funding given to the MTF commander to provide healthcare is based upon historical data received from the

individual MTF. The data generated by each MTF are sent to the central data repository for analysis. The data being analyzed consist of clinical, cost, and purchased care information. The data are stored in the central repository and can be used to project an MTF's budget, personnel requirements, or to measure provider productivity. MTF commanders, staff officers, and providers should have a thorough understanding of this process to ensure accurate reporting. The data contained in the repository are used at the highest levels, including the Office of the Secretary of Defense (OSD), to make important management decisions regarding the future of military medicine.

To improve the level of accuracy and adequately measure provider workload, the Centers for Medicaid and Medicare (CMS) began using a resource-based relative value scale (RBRVS) for payment of Medicare services by both the federal and civilian organizations during 1992 (Glass, 2002). RBRVS consists of a schedule of fees at which providers are reimbursed for their services. The RBRVS system was introduced in the 1980s and is still widely utilized today. A component of the RBRVS is the relative value unit (RVU). RVUs are designed to measure physician (and midlevel provider) effort and degree of independent decision-making skill required for performing a procedure (Anderson & Glass, 2002b). RVUs also assign relative weights to medical procedures primarily for the purpose of reimbursement of services performed, but also for productivity measurements, cost analysis, and benchmarking (Anderson & Glass, 2002a). The RVU metric has become the primary practice

management tool for both federal and civilian agencies. Within the Army Medical Department (AMEDD), the Surgeon General (SG) and his staff use the RVU metric to measure how well the AMEDD is accomplishing its strategic plan.

The SG uses the Balanced Score Card (BSC) to communicate his strategic plan to all AMEDD personnel. RVU analysis is one of the key components used to evaluate the success in achieving the AMEDD's strategic plan. The RVU metric is used to analyze provider productivity and aides the SG's desire to promote and maximize efficiency. It also allows the SG and his staff to evaluate the costs incurred for providing care, which can in turn reduce the medically related costs incurred due to provider inefficiency at the organizational level. As the MHS transitions to a more "business like" environment, the ability to compare MTFs against external healthcare organizations will be crucial to the continued success of military medicine. Using the RVU metric as a management tool allows commanders and administrators to examine many aspects of provider practice patterns and the utilization of the organization's resources.

Conditions Which Prompted the Study

Europe Medical Command (MEDCOM), Landstuhl Regional Medical Center's (LRMC) higher headquarters, currently tracks provider productivity with RVUs. Important budgetary and personnel decisions are based on the analysis of RVU data. For example, the Officer Distribution Plan (ODP) is currently being developed at LRMC. The ODP will determine how many active duty permanent party personnel, to include providers; LRMC and other MTFs will

receive in fiscal year 2005. Senior leaders in the AMEDD will utilize the RVU metric to assist personnel leaders in identifying which organizations need which type of providers. Organizations such as LRMC will now have to compete for personnel based upon its RVU data.

LRMC is a 148 bed medical center located in central Europe responsible for providing primary care services to over 100,000 beneficiaries spread throughout central Europe. LRMC is also the referral base for two major theaters, European Command and Central Command. Since the beginning of the Global War on Terrorism, LRMC has experienced a substantial increase in workload. As a result of Operations Enduring Freedom (OEF) and Operation Iraq Freedom (OIF), LRMC has cared for more than 15,000 deployed soldiers. This has resulted in a 29% increase in RVUs per provider per day from 2002 to 2004. As a result of this workload increase, LRMC has been augmented with 250 Army reserve personnel from the 349th General Hospital and 60 active duty Air Force augmentees. The Army reserve personnel are due to rotate back to the United States in August 2006, except for the reserve providers who rotate every 90 days. All of the Air Force augmentees rotate every 90 days. The providers at LRMC believe the high turnover has had an effect on historical RVU data.

Based upon LRMC's 2003 RVU data, the SG and his staff believe the workload at LRMC can be cared for with LRMC's pre OEF and OIF staffing level. However, LRMC's executive staff and providers disagree. Given the RVU's role in decision making

related to human resource requirements, LRMC must be able to substantiate that the RVU metric is a valid, reliable, and accurate measure of provider performance at LRMC. The use of the RVU in the decision making process must be moderated by the presence or lack of these characteristics.

Providers at LRMC do not believe the workload they perform is reflected by the RVU metric. Providers at LRMC consistently declare they are performing more procedures and encounters than what the productivity measures state (Appendix A). LRMC is currently staffed with a number of reserve and augmented support staff who are assigned for short periods of time. The temporary providers may not be properly trained in the administrative procedures at LRMC, may lack the knowledge necessary to comply with administrative policy and procedures, and may face challenges in understanding and complying with organizational norms and idiosyncrasies. Because of these causes, the organization may likely experience *performance gaps*, or mistakes, in individual and aggregate performance. The increased workload coupled with the transition of personnel may have substantially affected the accuracy of the data used in measuring RVUs at LRMC.

Frequent provider turnover has also added to the number of providers who are not properly trained in completing the Clinical Utilization Worksheet (CUW). The Chief of the Uniform Chart of Accounts Personnel Utilization System (UCAPERS) section stated, "In some cases providers have refused to complete the CUW because they believe they are too busy" (D.N. Rinder,

personal communication October 27, 2003). The CUW, also known as the UCAPERS time sheet, is a tool LRMC administrators use to track how much time providers spend in the clinic setting caring for patients. The information take from the CUW is used to assist with calculating a provider's RVUs.

Another contributing factor to decreased levels of RVUS is poor data quality. A number of providers do not properly document the care they perform in the patient's chart. For example, if a provider sees a patient who displays signs and symptoms of an upper respiratory infection and the provider only documents the encounter as a common cold the patient will only be coded for a common cold instead of an upper respiratory infection. Therefore, the patient encounter will be under-coded and the provider will have a decreased level of RVUs for that encounter. Precise documentation (to include coding) and proper completion of the CUW are essential to determining RVUs and accurately measuring provider productivity at LRMC.

Statement of the Problem

Numerous decisions are made based upon the RVU data derived from the central data store. The central data store is an information database located in Denver, Colorado and is comprised of over 260 data systems receiving clinical, financial, and demographic information. The providers at LRMC have stated that information being reported to the database does not accurately reflect the workload being performed (J.H. Choe & A.D. Moore, personal communication December 18, 2003). This study intends to locate the breakdown in the reporting of this

data by answering the following questions. How is the RVU calculated? Is the relative value scale (RVU metric) an accurate measurement tool for evaluating provider productivity at LRMC? How can LRMC improve its business and management practices to accurately capture provider workload and improve data quality? What decisions will be based upon RVU data?

Review of Literature

The declining federal and state budgets of the early 1990's, as well as financial pressures placed on hospitals during that time, set the conditions for the implementation of a nationally standardized fee schedule, RBRVS (Bergey, 1991). The initial objective of RBRVS was to decrease Medicare payments paid to providers. Before the introduction of RBRVS, Medicare reimbursed providers on a "reasonable charge" method that paid the provider the lesser of an actual charge or the prevailing charge for similar services (Broughton & Rogers, 1993). The RBRVS was designed to "level the playing field," or distribute Medicare payments more equitably among providers. Under the RBRVS, providers are paid a predetermined rate for each procedure, regardless of the cost incurred by the provider (Berlin & Faber, 1997). The implementation of the RBRVS standardized physician fees and gave administrators a powerful tool to account for expenses.

The RBRVS is comprised of over 7,000 common procedural terminology (CPT) codes, descriptions of procedures, and the RVU associated with each code. The purpose of the CPT code is to provide a uniform language that describes medical, surgical, and

diagnostic services, and thereby serves as an effective means for reliable nationwide communication among physicians, patients, and third parties (St. Andrews, 2003).

The RBRVS established relative values on the basis of the resources used by physicians to perform a particular service (Donnelly, 1993). The RBRVS further subdivides resources into three categories: physician work, practice expense, and malpractice expense (Donnelly).

Physician work encompasses all the time spent before, during, and after the service to include the intensity of that time. Dunn, Sulvetta, and Verrilli (1996) further define physician work as the "(1) mental effort and judgment, (2) technical skill and physical effort, and (3) psychological stress involved in delivering care to patients" (p. 42).

Practice expenses are payments for rent, support staff, and supplies. These expenses vary greatly depending on the provider's gross revenue, mix of services, practice location, and specialty of the provider. For example, a family practice provider may require an office, two exam rooms, and 2.5 support staff in order to see his desired patient mix, whereas a perinatologist may prefer a practice setting which, consists of an office, one exam room, and two support personnel to accommodate the provider's practice.

The final component of RBRVS is malpractice expense. Malpractice expense varies between specialties. An obstetrician's malpractice expense is substantially higher than the malpractice expense incurred by a dermatologist due to the

amount of risk associated with providing obstetrical care. These three components combine to determine the RVU for each procedure performed by a physician.

The term RVU has been applied to many systems that have attempted to set a value, or some form of workload measurement indicator to specific procedures. These "relative units" are numbers that indicate the relative value or worth of various services and procedures. The higher the numeric value associated with a procedure or service, the higher the worth (Bergey, 1991). Anderson and Glass (2002a) define "RVUs as nonmonetary relative units of measure assigned to medical CPT codes copyrighted by the American Medical Association. These units are objective, standardized indicators of the value of services and measure relative differences in resources consumed" (p. 225). To calculate a simple RVU, an administrator adds physician work (RVUw), practice expense (RVUpe), and malpractice expense (RVUm). An example of an RVU calculation is shown in Table 1.

Table 1

Relative Value Unit Calculation

CPT Code	Description of procedure: Outpatient visit	RVUw	RVUpe	RVUm	Total relative value	Encounter
99212	Minor to low severity	0.45	0.59	0.02	1.06	1.00
99213	Low to moderate severity	0.67	0.72	0.02	1.41	1.00
99214	Moderate to high severity	1.10	1.07	0.04	2.21	1.00

The Military Health System (MHS) uses RVUs to capture provider productivity. The MHS modified the RVU formula to more

accurately reflect the nature of military medicine by excluding the practice expense and malpractice expense components of the formula. One reason for the modification in the formula is that military providers do not pay malpractice premiums nor do providers focus on individual expenses. The federal government pays the expenses incurred by a provider; therefore, providers are insulated from the effects their decisions have on medical costs because of how the payments are rendered. As a result, the MHS uses the simple RVU as its productivity measure. The simple RVU is derived from predetermined rates which are based on evaluation and management codes and CPT codes. In the MHS, the simple RVU consists only of the RVUw.

RVU analysis is also used for strategic planning, resource allocation, budgeting, and provider compensation (Anderson & Glass, 2002a). Using RVUs as a management tool allows administrators to analyze cost and productivity. Through benchmarking, RVU analysis provides practice managers with the capability to make inter and intraorganizational comparisons at both the individual and organizational levels of analysis. Benchmarking assists the practice manager in understanding key performance and outcome measures which can add to an organization's profitability (Anderson & Glass, 2002d). Benchmarking also provides an understanding of the changes needed to facilitate improvements. For example, the MHS workload benchmark for FY 2003 increased from 14.5 to 15.4 RVUs per provider per day. The increase was based on a modification

in the calculation of the metric, which many believe allowed the MHS to capture more workload (St. Andrews, 2003).

Anderson and Glass (2002a) identify RVU cost analysis as another growing trend among group practices because it can be used as a tool to increase profitability. It allows practice administrators to determine the cost per relative unit of the services rendered. For example, if a provider needed to determine the price per procedure for any CPT code, he would simply multiply the total RVU and cost then divide by RVU for the procedure (Anderson & Glass, 2002c). This allows providers and administrators to focus on drawing in the services needed in order to have an optimal patient mix. Similar to determining cost, RVUs can also be used to determine provider productivity.

The advantage of measuring provider productivity through RVUs is that it allows administrators to compare provider performance across specialty lines within a group practice and with external practice groups (Shackelford, 1999). RVUs allow provider productivity to be measured in non-financial terms. As stated earlier, measurement of clinical productivity can be obtained with RVUs; however, the implications of using these RVUs as metrics that inform the decision making process depends upon their accuracy and reliability. Data quality is of utmost importance. If the medical services and procedures rendered are inaccurately coded, the RVU analysis—and subsequent organizational decisions based upon such analysis—will be defective.

Coding accuracy and proper completion of the CUW is the key to RVU analysis. Correctly calculating RVU data is heavily dependent upon coding accuracy and proper documentation of the patient care encounter. The MHS uses the Ambulatory Data Module, a component of the Composite Health Care System (CHCS), to capture patient encounters (St. Andrews, 2003). The data derived from CHCS and the CUW are used in RVU analysis. Providers within the AMEDD use the CUW to measure the amount of time they spend providing patient care. The CUW will be scrutinized to determine its accuracy in accounting for the provider's time.

RVU analysis provides administrators valuable insight into how their organization functions; however, RVUs should not be used solely for determining provider productivity, cost analysis, or to set productivity benchmarks (Anderson & Glass, 2002b). Anderson and Glass recommend other metrics be used to check the accuracy of RVU analysis. Case intensity and trends in patient population can also be used to measure patient encounters, RVUs, and procedures per patient (Anderson & Glass). In the MHS, the simple RVU is currently believed to be the best management tool for measuring provider productivity. This belief is based on the assumption that the personnel who are responsible for coding the records are accurately reflecting the events of the patient encounter.

A study conducted by Hoffman and Jones (1993) revealed that training had a measurable and lasting effect on coding accuracy. The study of over 20,000 records, revealed that after employees

received training on the technical principles of coding and how to understand clinical practice. The average case mix index rose from 1.42 to 1.55, a 9% increase. Along with the notable increase in case mix, Hoffman and Jones reported a significant decrease in coding error rates in the first three months after training. After the initial training period of the employees, the focus shifted to improving communication between the providers and coders. This approach allowed the coders to clarify and have questions concerning documentation answered by the providers. The coder was able to more accurately document the care being conducted by the providers (Hoffman & Jones).

The development and implementation of formalized training programs can also help organizations avoid costly litigation resulting from poor coding. Faustina (2000) reports that the emergency room physicians at Pomona Valley Medical Center allegedly over-billed federal health insurance programs, including Medicare, from 1995 to 1998. The medical center paid \$1.2 million to the federal and California state governments to settle the dispute, which alleged inadequate or poor coding. Faustina believed the lawsuit would have been averted if the facility would have had trained coders coding the records instead of providers who had no training in coding.

Realizing the value of having trained coders, the Europe Regional Medical Command (ERMC) offered a one time training program in March 2003 that trained administrative personnel to be coders. The program consisted of over 20 hours of instruction and presented the following subject matter:

healthcare common procedure coding, evaluation and management coding, International Classification of Disease Ninth Revision, and Common Procedural Terminology. Although the training did not certify attendees, it did provide the attendees with a broad knowledge of coding principles to enhance their job performance and ultimately help the organization by accurately capturing the workload being performed. To further assist with accurately capturing workload, the Noncommissioned Officers in Charge (NCOIC) of every clinic in each of the three MTFs within ERMIC attended a training seminar on the CUW.

As of 1 December 2003, the NCOICs were responsible for completing the CUW. To facilitate this initiative, ERMIC conducted a training seminar to teach clinic NCOICs how to properly complete the CUW. The seminar was designed to provide the NCOICs with an intermediate knowledge of the CUW. The seminar lasted three days and covered all the administrative tasks involved in completing the providers' worksheets. The training taught the NCOICs how to process new providers into the organization and furnished the providers with a basic overview of the worksheet. The training also consisted of defining each category used to account for the time providers spend conducting patient care and other activities throughout their work week. Some of the training was scenario based and provided the NCOICs with a thorough understand of what was expected of them in their new duty. The CUW is an integral part of calculating RVUs; therefore, the NCOICs were required to attend this training.

This initiative was designed to relieve the administrative burden placed on providers. A study conducted by Bovier and Perneger (2003) found that providers were dissatisfied in regards to the additional workload generated from the growing administrative burden placed on providers. The study further suggests that the increased administrative burden takes away from the amount of time providers spend with patients, family, and friends. Bovier and Perneger also reported a negative relationship existed between work related stress and administrative burden. As the administrative burden increased, the level of dissatisfaction and work related stress increased.

Another study performed by McGlynn (2003) found that in order for providers to meet the additional administrative requirements placed upon them by the U.S. Preventive Services Task Force they would have to spend an extra 7.4 hours per working day to fully satisfy all the recommendations of the task force. The ERMC Commander's plan to have the NCOICs complete the CUW will alleviate some of the administrative burden the MHS has placed on its providers.

Purpose

The purpose of this study is to gain a holistic understanding of the factors that contribute to ineffective reporting of provider productivity data. This study intended to define how RVUs are calculated, determine if the RVU metric is an accurate measure of provider productivity, discuss future decisions that will be based upon RVU data, and to improve current business practices and evaluate data quality issues.

Methods and Procedures

A retrospective study of LRMC's outpatient medical records was conducted to determine the accuracy of reporting provider productivity and to justify utilization of the RVU metric as a management tool for measuring provider productivity at LRMC. Provider productivity was defined as the number of RVUs per provider per day. As stated earlier, the MEDCOM benchmark is 15.4 RVUs per provider per day.

In order to substantiate LRMC's claim that the organization has produced more workload than what is being reported the study focused on two hypotheses. First, individual and aggregate productivity—measured by RVUs—depends upon whether coders have been trained in coding procedures and whether the provider or an assistant captures workload. Second, coding accuracy depends upon the extent to which coders have been trained in coding procedures. Based on the literature, trained coders tend to be more accurate in their work and providers are more productive and likely to complete administrative and clinical duties if assisted by administrative staff.

Two dummy predictors were created to evaluate the effect of training and administrative assignment on select outcome variables. The first independent variable is a dichotomous variable where $X_1 = 1$ if the coder has been formally trained under the LRMC's coder initiative program (0 otherwise). Next a slope dummy representing administrative assignment was created where $X_2 = 1$ if a physician completed the CUWS (0 otherwise—condition also indicates NCOIC completion). The dependent

variables consisted of RVUs per provider per month (Y_1) and coding accuracy (Y_2).

Data Collection Process

The first step in the data collection process consisted of running an end of day report to identify patients that had been treated in the Family Practice Clinic (FPC) during the periods studied. The records were then screened to determine which records were maintained in LRMC's outpatient medical records section. The data pulls included both initial and follow-up appointments. The first data pull, April 2003, consisted of the records that were coded by an employee who did not attend the formal coder training conducted in May 2003. The first time period also consisted of the CUW being completed by the providers. The second data pull, December 2003, contained records coded by the formally trained coder, the coder who attended the coding course held at ERMHC Headquarters. The CUW during the second time period was completed by the NCOIC of the clinic. The NCOIC of the FPC received a three day training seminar on the process to more accurately account for the provider's time spent providing patient care services, administrative time, and the various other choices offered on the CUW.

Sampling Design

After the patients who received care at the FPC were identified for the months of April and December 2003, the patient list was narrowed to focus on the five primary care providers who volunteered to participate in this study. Then

CHCS was queried to determine which patients actually maintained their records at LRMC. Fifty records were pulled, 10 per physician, to represent the patient population treated by the selected physicians within the FPC during the time periods studied. The sampling strategy employed in this study consisted of both quota and convenience sampling. The outpatient medical records clerk was instructed to select the first 10 records of the patients who were seen by the providers during the months studied. Ten charts per provider were then chosen for a total of 50 records per time period.

Validity and Reliability

To ensure the study's validity, the same measurement tool was used for both data sets. The measurement tool (Appendix B) is a widely accepted tool used by coding auditors to determine if records are under or over coded. The patient records were also audited by a certified coding-auditor with over 20 years of experience in coding both outpatient and inpatient records. The coding auditor for this study is certified with the American Academy of Professional Coders and the American Health Information Management Association. Utilizing the expertise of an experienced certified coding auditor, established the standard to analyze the varying levels of coding at LRMC. Finally, the use of a proven measurement tool, which consistently and accurately measures proper documentation, adds to the study's validity and reliability.

Data Analysis

The data were analyzed with bivariate correlation analysis which measures correlations between noncontinuous and continuous variables. The categories coder and data recorder are dichotomous variables; therefore, point-biserial correlation (r_{pb}) was used to correlate the dichotomous variables with the continuous variables. Linear regression was used to predict the effect the independent variables had on the dependent variables.

Results

Descriptive statistics for the variables are displayed in Table 2. The table shows the sample size, minimum and maximum values, mean and the standard deviations of the variables. A multiple correlation analysis was conducted to measure the strength or closeness of the variables. See Table 3 for the point-biserial correlation coefficients. The most significant relationship existed among RVUs per provider, coders, and data recorders. The correlation between RVUs per provider and formally trained coder showed a direct correlation, $r_{pb} = .351$. This supports the first hypothesis discussed earlier and shows an association between the two variables. An inverse relationship existed among RVUs per provider and the data recorder, $r_{pb} = -.351$. The perfect association between these two correlation coefficients is the result of linear dependency between X_1 and X_2 .

Table 2

Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Coder	80	0.00	1.00	0.625	.487
Data Recorder	80	0.00	1.00	0.375	.487
Coding Accuracy	74	0.00	1.96	0.986	.277
RVUs Per Provider	80	1.80	24.10	12.674	6.308
Coder RVUw	80	0.00	1.53	0.612	.330
Coder Auditor RVUw	80	0.00	1.53	0.614	.310

Table 3

Point-Biserial Correlation Coefficients

Variable	1	2	3	4	5
1. Coder					
2. Data recorder	-1.000**				
3. Coder RVUw	-.157	.157			
4. Auditor RVUw	-.155	.155	.753**		
5. Coding Accuracy	.044	-.044	.421**	-.151	
6. RVUs per provider	.351**	-.351**	.032	.130	-.066

** $p < .01$, 2-tailed.

The results of linear regression analysis indicate that average RVUs per provider are lower when providers complete the CUW. On average, RVUs per provider decreased by 4.7 units when the providers complete the CUW versus having the NCOICs complete the form ($p < .01$). Because of perfect co-linearity between X_1

and X_2 , regression on the dummy variable indicating training status was redundant and unnecessary for analysis. Regression analysis did not reveal a significant relationship between training and coding accuracy. Although coding accuracy decreases .025 units given formal training, the value of the coefficient's test statistic is less than 1 ($p > .5$).

Table 4

Regression Analysis

Variable	<i>B</i>	<i>SE B</i>
Model 1		
Data Recorder	13.880	.896**
RVUs	-4.700	1.267**
Model 2		
Coder	.971	.052**
Coding Accuracy	.025	.066

** $p < .01$, 2-tailed.

Discussion

The focus of this study was to determine if the RVU metric should be utilized as a management tool to make personnel staffing, budgetary and equipment decisions at LRMC. The author believes the RVU metric has the potential to be an effective measurement tool; however, data quality issues would need to be resolved before it can be used as the sole productivity measurement at LRMC.

Landstuhl Regional Medical Center has a unique mission. The medical center provides care not only to its overseas population but also, to the many soldiers, sailors, and airmen who are participating in the current military operations. The additional workload from those operations has significantly impacted the documentation practices of the providers, clinicians, and administrative staff of the facility. Until recently, LRMC was not adequately staffed to deal with the increase workload generated by the additional patients. The author believes this is evident in the April 2003 data pull. The average RVUs per provider per day for this time period is well below the previously stated benchmark of 15.4 RVUs per provider per day. Therefore, the RVU metric should not be used as a management tool at LRMC at this time due to the current resource staffing plan and operational tempo.

The coding audit conducted during April 2003 found a large number of records with missing documentation (Table 5). The provider's documentation of an encounter is a critical step in the process needed to accurately code the record and assign an RVUw. Providers have stated that the increase in workload has decreased the amount of time available to document care during the encounter. Further, providers often document care after the encounter has occurred. This practice typically does not reflect the level of care given during the encounter because the provider may have over looked a symptom that could have changed the RVUw or may have forgotten to document the encounter altogether. During the April 2003 time period, Provider B had

seven records, which could not be coded because of poor or lack of documentation. The author believes this had a significant effect on the provider's RVUs. Provider B's average RVUs per day for the month was 1.8, which is well below the MEDCOM standard of 15.4 RVUs per day. This is yet, another reason why the RVU metric should not be used as a management tool at LRMC.

Table 5

April 2003 Records with Incomplete Data

Provider	Records Reviewed	Records Missing	RVU Average
A	10	3	21.10
B	10	7	1.80
C	10	4	5.20
D	10	1	11.70
E	10	5	6.20

Another chart review conducted at LRMC revealed an additional problem between the providers and the coders. Many of the coders cannot code the records because they are having difficulty deciphering the providers' handwriting. The coders cannot determine what procedure is being done; therefore, the appropriate workload credit cannot be given to the provider. An easy solution to this problem would be to force all the providers to document care in CHCS, presently only 5 to 10% of providers document care in CHCS. An additional example of poor data quality deals with the inability of providers to properly complete the CUW.

The CUW is used to reflect the amount of time a provider spends performing various activities throughout the month such

as time spent in the clinic or conducting military activities (Appendix C). The CUW is an essential component needed to determine the providers' RVUs per day because only the time spent providing patient care is calculated in determining a provider's RVU. During April 2003, Provider D only spent 10 days conducting patient care due to military obligations. Fortunately, the time he spent conducting military training did not increase or decrease his level of RVUs. However, there have been some reports of providers failing to complete or inaccurately completing the CUW. When this occurs MTFs cannot accurately report the true workload performed by the providers.

The ERMC Commander and subsequently the LRMC Commander realized the importance of accurately accounting for how providers spend their time and wanted the CUW to be more accurately completed. Both commanders focused their organization's attention toward data quality in an effort to maximize resources. During November 2003, the ERMC Commander instructed all subordinate units to begin having the clinic NCOICs complete the CUW for the providers on a daily basis. He believed the NCOICs would be able to more accurately report how the providers spend their time. This practice appears to be working. The December 2003 findings associated with the study were statistically significant at the .01 level, which bolsters the claim that the RVU metric may be an ineffective management tool at LRMC. The findings suggested providers did not accurately account for their time on the CUW; therefore, their RVUs were consistently inaccurate while they were responsible

for completing the worksheet. Another initiative by the ERM Commander involved having formally training coders code the records.

Recognizing that MEDCOM is beginning to heavily rely on the RVU as a management tool for various resources, the ERM Commander sought to place a formally trained coder in high volume clinics with the intent of increasing throughput and increasing the number of RVU per provider. The Commander believed that by placing formally trained coders in the clinics it would allow providers to spend more time caring for patients and less time on administrative tasks such as assigning codes. This practice appears to have paid off. An increase in the level of RVUs per provider was noted for the December data pull, as indicated in the results section. This strengthens the argument that LRMC needs to have trained coders in each of its clinics, especially those affected by OEF/OIF. The results show a correlation between RVUs per provider and having a trained coder code the record.

The second hypothesis dealt with the accuracy of coding at LRMC. The author sought to determine if the RVUs per provider were incorrect secondary to the inexperience of the coders who were not formally trained. From the information gleaned from the statistical analysis, a relationship between having a formally trained coder versus having a coder who has had no formalized education existed; however, the relationship is not statistically significant. The results from this hypothesis

were unexpected and will be discussed further in the next section.

Limitations

The use of non-probabilistic sampling methods and unexplained heterogeneity limit the external validity of this study. These limitations suggest that a further and more detailed study is needed to fully address the issue of provider productivity not only at LRMC but also, throughout the MHS. An additional limitation of the study is that it only looked at data from the FPC and did not focus on the various other clinics in the facility. Most notably, the specialty clinics such as the Orthopedics Clinic have seen a significant increase in workload as a result of OEF/OIF. This particular clinic does not have a coder: The physician is responsible for coding the record and for ensuring the record has the appropriate level of documentation.

Another limitation consisted of the closeness of the second data pull to the implementation of having the NCOICs completing the CUW. In order to assess a true change in the business practice, the second data pull should have occurred three to six months after the NCOIC began completing the CUW for the providers. This grace period would have allowed the NCOICs and providers ample time to become familiar with the process and the various codes on the worksheet.

The second hypothesis, coding accuracy as a function of coder, was not statistically significant. This finding probably occurred as a result of the definition of the variable. The

formally trained coders are not certified coders. They received training during a seminar and are not affiliated with a professional coding organization.

Additional limitations involve the effect of staff turnover and the increased workload. LRMC would not be able to meet its current mission of caring for the soldiers from OEF/OIF if it were not for the 90-day *Boots on the Ground Program* consisting of reserve providers, clinicians, and administrative staff temporarily assigned to the facility. The effect of the reserve units and temporary employee turnover was not taken into consideration during this study. The workload of the providers who are temporarily assigned was not looked at and would be a variable that should be taken into account when looking at the facilities RVUs. Most of the reserve providers are activated for 90 days. By the time the providers arrive at LRMC they have less than 70 days to learn the policies and procedures at LRMC. Many of the reserve providers are in civilian practices that have an administrative staff to perform many of the functions they must perform while they are activated (e.g., completion of the CUW).

Recommendation and Conclusion

Future studies involving the RVU metric should focus on correcting the shortcomings of this study, which were identified in the limitation section. Additional studies should ensure adequate time elapses between implementation of the initiatives and the assessment phase. This will ensure the researcher

receives an accurate evaluation of the effectiveness of the interventions.

As stated earlier, MEDCOM formulates policy and makes management decisions based upon a facility's RVU data. The author staunchly believes the conclusions gleaned from this study indicate the RVU metric is not an effective management tool at LRMC and other forms of management analysis should be utilized to determine resource allocation. This study was not meant to place blame on the providers nor the coders for the inaccuracy of the RVU data. The intent was to identify the business practices that could potential cause the organization to lose valuable resources as a result of poor data quality.

In conclusion, data quality continues to be of utmost concern to leaders throughout the AMEDD. The command team at LRMC, along with the providers, is dedicated to correcting the organization's data quality concerns related to RVU analysis. The command team has identified strategies to improve the accuracy of RVU analysis; however, until those initiatives have been successfully implemented, organizational leaders should understand the limitations and implications of using the RVU in the decision making process.

References

- Anderson, J. & Glass, K. (2002a). Relative value units: from A to Z (Part I of IV). *The Journal of Medical Practice Management*, 17(5), 225-228.
- Anderson, J. & Glass, K. (2002b). Relative value units and productivity: Part 2 of 4. *The Journal of Medical Practice Management*, 17(6), 285-290.
- Anderson, J. & Glass, K. (2002c). Relative value units and cost analysis, part 3 of 4. *The Journal of Medical Practice Management*, 18(2), 66-70.
- Anderson, J., & Glass, K. (2002d). Relative value units: from A to Z, Part 4. *The Journal of Medical Practice Management*, 18(3), 120-123.
- Bergey, T. W. (1991). Sorting out the three Rs: RVU, RVS, and RBRVS. *Radiology Management*, 13(4), 35-39.
- Berlin, M. F., & Faber, B. P. (1997). RVU costing applications. *Healthcare Financial Management*, 51(11), 78-81.
- Bovier, P. A., & Perneger, T. V. (2003). Predictors of work satisfaction among physicians. *European Journal of Public Health*, 13, 299-305.
- Broughton, A. K., & Rogers, M. M. (1993). Helping physicians cope with RBRVS. *Hospital Topics*, 71(4), 27-31.
- Cantor, J., Delia, D., & Duck, E. (2001). Primary care productivity and the health care safety net in New York city. *The Journal of Ambulatory Care Management*, 24(1), 1-14.

- Chin, M. A. (2002, March 22). *MSHER big picture*. Retrieved November 10, 2003, from Health Affairs Web Site: http://http://tricarene.army.mil/conference/conf_pres/W503%20LTC%20Mark%20Chin.ppt.
- Donnelly, J. (1993). RBRVS as a financial assessment tool. *Journal of Healthcare Financial Management Association*, 47(2), 44-46, 48, 50-51.
- Dunn, D. L., Sulvetta, M. B., & Verrilli, D. K. (1996). The measurement of physician work and alternative uses of the resource based relative value scale. *The Journal of Ambulatory Care management*, 19(4), 40-48.
- Fairchild, D., Gharib, S., & McLoughlin, K. (2001). Productivity, quality, and patient satisfaction: comparison of part-time and full-time primary care physicians. *Journal of General Internal Medicine*, 16(10), 663-667.
- Faustina, S. (2000). Pomona doctors pay U.S. \$1.2 mil. in billing action. *The Business Press*, 3.
- Glass, K. P. (2002). Tracking RVU productivity. *MGMA Connexion*, 2(1).
- Henderson, K., Jinnett, K., Mukherjee, S., & Sullivan, G. (2003). How mental health providers spend their time: a survey of 10 veterans health administration mental health services. *The Journal of Mental Health Policy and Economics*, 6(2), 89-97.
- Hoffman, G., & Jones, D. (1993). Prebilling DRG training can increase hospital reimbursement. *Healthcare Financial Management*, 47(9), 58.

- McGlynn, E. A. (2003). Quality of health care delivered to adults in the United States. *The New England Journal of Medicine*, 349(19), 1866-1868.
- Procedure room, (2003). Procedure room for kids improves provider productivity, frees operating rooms (2003). *Performance Improvement Advisor*, 7(6), 90-91.
- Shackelford, L. (1999). Measuring productivity using RBRVS cost accounting. *Healthcare Financial Management*, 53(1), 67-69.
- St. Andrews, J. P. (2003). *A study of the relative value unit as a practice management tool for provider productivity*. Unpublished master's thesis, Baylor University, Texas.
- TRICARE Military Health System. (2003, June 11). *TRICARE: Basics*. Retrieved February 9, 2004, from United States Department of Defense Web Site: <http://www.tricare.osd/mil>
- Wahls, T. L. (2000). The master clinician project. *Journal of Ambulatory Care Management*, 23(4), 9-21.

Appendixes

- A. Provider Productivity Data
- B. Outpatient Record Audit Tool
- C. Clinical Utilization Worksheet

Appendix A. Provider Productivity Data



